NMEA USB Merger

* 2 NMEA 0183 V3.01 inputs (V1.5 & V2 compatible)
* User optional High Speed NMEA 38.4K Baud
* USB Hi Speed V2 (V1.1 compatible)
* Power direct from host PC or standalone operation
* Opto Isolated
* User selected filtering optional
* Plug ‘n’ Play. No set up required for simple operation

User Manual

HB-NUM-V1.01

Tinley Electronics Ltd., Anchor House,
Bath Road, LYMINGTON, SO41 3YJ
Tel: 01590 610071 Fax: 01590 610072
email: electronics@tinley.net
www.tinleyelectronics.com

Introduction

Congratulations on your purchase of the USB Merger from Tinley Electronics. This interface combines clever thinking with incredibly simple operation, and represents Tinley's commitment to providing customers with the finest products.

The USB Merger merges and filters 2 NMEA inputs into 1 NMEA output with an additional USB connection for a PC, allowing any navigation software to receive and transmit fully Opto-Isolated NMEA. Additionally, user selectable filters can be set to filter in or out any combination of NMEA sentences independently from either input. Use standalone 2 into 1 NMEA or connect to a PC to automatically provide 2 NMEA into USB and USB back to NMEA. No additional power supply is required when connected to USB. NMEA 0183-HS 38.4 K Baud can be selected on Input 1 and Output whilst still merging standard low speed NMEA through Input 2. This enables the unit to combine ATIS and GPS signals for instance.

Before you begin using your new Tinley product, please take the time to read this manual to help you achieve the full potential from your new interface.

Certification

This device meets requirements for CFR47 Part 15 of the FCC limits for Class B equipment, and meets the standards set out in European Standard EN 60945: 1997 IEC 945: 1996 for maritime navigation and radiocommunication equipment and systems.

Legal bit… Sorry!

Tinley Electronics Ltd accept no responsibility for the use of this equipment. This equipment is not designed to replace conventional navigation procedures. Information in this document is subject to change without notice. Tinley Electronics reserve the right to change its products and documentation without obligation to notify any person or organisation of such changes.

Operation

For basic operation the interface merges the two NMEA inputs to the one output. When USB is connected, the interface merges the two NMEA inputs to the connected PC and transmits data from the PC via the NMEA output.

As far as the host PC is concerned, the USB Merge Computer appears to be a COM port, (RS232). Note that other than selecting the correct COM port, no other settings are necessary… you do not have to select baud rate etc., this is automatic.

To find the correct com port, either:

1. Check in Windows Vista or XP 'Device Manager' under 'Ports (COM & LPT)'; the interface will be listed as 'TINLEY USB to UART (COM X)' where X = COM port number. The interface must be plugged in and driver loaded.
2. Open software, (such as Hyperterminal or your navigation package), without the interface plugged in and check the available COM ports under 'Properties' or similar. Close 'Properties' and Plug in interface. Now check the available COM ports again, noting the new one! Some software may require closing and re-opening to see new port.

Note that the COM port is specific to the USB port in use… if you change the USB port, the COM port will also change. Plug the interface back into the original USB port and the original COM port will be remembered, even when the PC reboots. This is useful if you want to use more than one USB Merge Computer!

Open the COM port in Hyperterminal and the interface will output the following start-up message:

```
Tinley Electronics Ltd (c) 2006
USB Merge Computer Version X.XX-X.XXX
```

Any valid data on either input will now follow in a continuous stream.

*** ALWAYS CONNECT USB BEFORE OPENING APPLICATION ***

Filtering

The NMEA 0183 protocol has its limitations… one of these is the speed and hence the maximum throughput of data. If the USB Merge Computer is overloaded with data, i.e. more data is available on the inputs than is physically possible to fit the output, some data MUST be discarded. The intelligent software maintains up to date data flow on a first come first served basis with minimum delay, while intelligently discarding repeated sentences. This ensures no important data is lost.

All incoming data is scrutinised to check for NMEA compatibility. Checksum, if present, and other parameters will be checked and the sentence will be discarded if corrupt. Note that corruption can occur due to electrical noise, poor connections or long cable runs, etc.

User Filtering

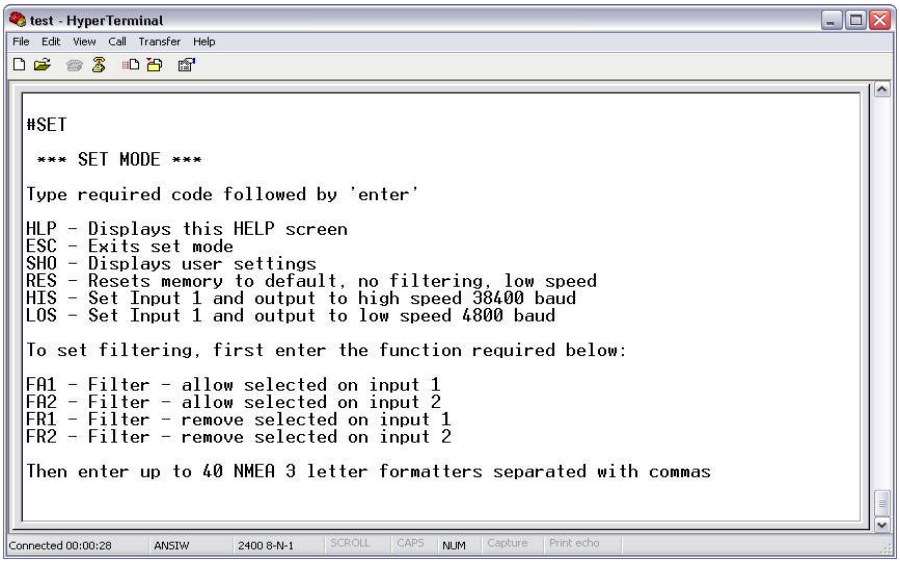
Filtering can be used to choose which device the data comes from, eliminate data loops, stop data overload, etc. There are two types of filtering that can be applied to each input independently.

1. Filter in (allow): Only allow sentences in the list to propagate.
2. Filter out (remove): Remove all sentences in the list.

To set filtering, some knowledge of the NMEA three letter formatters is assumed. First connect the interface to a USB equipped PC with driver loaded and ensure that no NMEA data is being received at the inputs. Using Hyperterminal or similar terminal software, select and open the correct COM port. Confirm the start-up message is displayed. To enter ‘SET MODE’ Type:

#SET return

The terminal window should now show a list of functions available as follows:


test - HyperTerminal
File Edit View Call Transfer Help
#SET
*** SET MODE ***
Type required code followed by 'enter'
HLP - Displays this HELP screen
ESC - Exits set mode
SHO - Displays user settings
RES - Resets memory to default, no filtering, low speed
HIS - Set Input 1 and output to high speed 38400 baud
LOS - Set Input 1 and output to low speed 4800 baud
To set filtering, first enter the function required below:
FA1 - Filter - allow selected on input 1
FA2 - Filter - allow selected on input 2
FR1 - Filter - remove selected on input 1
FR2 - Filter - remove selected on input 2
Then enter up to 40 NMEA 3 letter formatters separated with commas
Connected 00:00:28
ANSIW
2400 8-N-1
SCROLL
CAPS
NUM
Capture
Print echo

Most functions are self explanatory. To return to normal ‘RUN MODE’ use the ‘ESC’ function.

As an example, to set the interface to only allow ‘RMB’ and ‘RMC’ on input 1 type:

FA1 return **RMB,RMC** return

Interface confirms with the reply:

Channel 1 filter - allow:

RMB,RMC

To reset an individual input to no filtering type the function followed by an empty list as follows:

FA1 return, return

Interface confirms with the reply:

Channel 1 filter - none

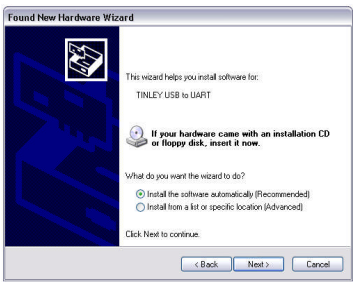
Installing Driver

The driver only has to be installed the first time the interface is plugged into each USB port. The CD is only required for the first installation port. For Windows Vista, XP, NT or 2000 the following driver file is provided: Tinley_NTXP.inf The following example is for windows XP.

1: Plug interface into required USB port. ‘Found New Hardware Wizard’ will be displayed. Select ‘No, not this time’ and click ‘Next’

Found New Hardware Wizard
Welcome to the Found New Hardware Wizard
Windows will search for current and updated software by looking on your computer, on the hardware installation CD, or on the Windows Update Web site (with your permission).
Read our privacy policy
Can Windows connect to Windows Update to search for software?
Yes, this time only
Yes, now and every time I connect a device
No, not this time
Click Next to continue.
< Back
Next >
Cancel

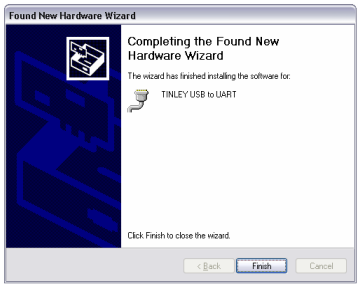
2: Insert CD. If windows does not automatically detect CD then click ‘Next’


Found New Hardware Wizard
This wizard helps you install software for:
TINLEY USB to UART
If your hardware came with an installation CD or floppy disk, insert it now.
What do you want the wizard to do?
Install the software automatically (Recommended)
Install from a list or specific location (Advanced)
Click Next to continue.
< Back
Next >
Cancel

3: Ignore warning and click ‘Continue anyway’

Hardware Installation
The software you are installing for this hardware:
TINLEY USB to UART
has not passed Windows Logo testing to verify its compatibility with Windows XP. (Tell me why this testing is important.)
Continuing your installation of this software may impair or destabilize the correct operation of your system either immediately or in the future. Microsoft strongly recommends that you stop this installation now and contact the hardware vendor for software that has passed Windows Logo testing.
Continue Anyway
STOP Installation

4: Wait for software to load and click ‘Finish’


Found New Hardware Wizard
Completing the Found New Hardware Wizard
The wizard has finished installing the software for:
TINLEY USB to UART
Click Finish to close the wizard.
< Back
Finish
Cancel

For windows 98 SE two driver files are provided in the directory: win98. Manually select the first driver: tin98_1.inf and the second driver should install automatically. The Windows 98 CD may also be requested.

NMEA USB Merger Installation Diagram

Software Version 1.01

Power supply:
Not required when using USB

12/24 Volts nominal
9-32 Volts < 150mA
Under full load

Protect with 250mA fuse

Inputs exceed accordance to NMEA 0183 versions 1.5, 2.X, 3.01 and 0183-HS
RS232 compatible (EIA-422-A)
Sensitivity better than 1.4V
@ better than 1mA

Over voltage and reverse polarity protected

Full Opto Isolation better than 5kV

Output exceeds accordance to NMEA 0183 versions 1.5, 2.X, 3.01 and 0183-HS (EIA-422-A). Max 60mA.

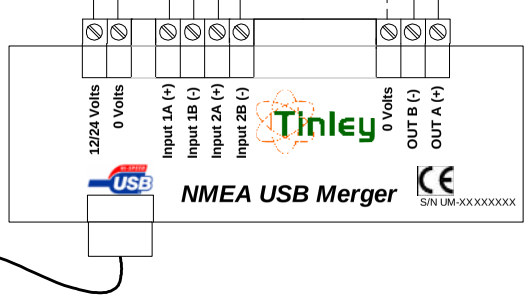
Can drive more than 30 NMEA inputs!

Short circuit protected

Note: Some interfaces that are not compliant with NMEA 0183 or EIA-422, (PC's or RS232 for example), can cause a conflict with this output. This results in excessive current drawn and corruption of data. If this is the case, (and on all PC's), connect 'Output A' as the output signal and use '0 Volts' as signal ground. Do not connect NMEA Output B to 0V or ships ground. If in doubt, use a multimeter to check for continuity between the connecting equipment's NMEA ground input and ships ground.

USB Hi-Speed
V2.0
(Also compatible with V1.1)

Drivers provided on CD for:
Windows Vista
Windows XP
Windows 2000
Windows 98 SE
Windows NT



Compass safe distance: 200mm

A=Signal
B=Return

Tinley Electronics Ltd.
Anchor House, Bath Road,
Lymington, SO41 3YJ.
England

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Tel: +44 (0) 1590 610071
Fax: +44 (0) 1590 610072
e-mail: electronics@tinley.net
Website: www.tinleyelectronics.com